Genetic Enhancement of the Immune Response to Melanoma via hESC-derived T cells

Grant Award Details

Genetic Enhancement of the Immune Response to Melanoma via hESC-derived T cells

Grant Type: SEED Grant

Grant Number: RS1-00203

Investigator:

Name:	Zoran Galic
Institution:	University of California, Los Angeles
Type:	PI

Disease Focus: Cancer, Melanoma, Solid Tumors

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $616,800

Status: Closed

Progress Reports

Reporting Period: Year 2

View Report

Grant Application Details

Application Title: Genetic Enhancement of the Immune Response to Melanoma via hESC-derived T cells

Public Abstract:

The overall goal of the proposed studies is to utilize human gene therapy approach using human embryonic stem cells to direct our body's defenses to specifically attack melanoma tumor cells. Current technologies try to accomplish this by genetically manipulating certain circulating T lymphocytes, such that they will target tumor cells. T lymphocytes are the major cell type of our body's immune system. However it is likely that this type of approach will not result in the presence of stable, lifelong genetically modified T cells. In contrast, a potentially more long-lasting approach would be to genetically modify human embryonic stem cells with the same therapeutic gene. Stem cells have the ability to form any type of blood cell, including T cells. Importantly, stem cells can persist for the life of the individual, and thus have the potential to produce genetically modified T cells for many years. In addition, these new tumor specific cells should expand in the body in response to the presence of the tumor, thus a large supply of tumor-fighting cells should be available as long as needed. This project proposes to develop novel means to introduce the anti-cancer gene into human embryonic stem cells. These stem cells will then be differentiated to generate tumor specific T cells utilizing animal model systems. We will then use several laboratory and mouse models to determine if the T cells derived from these genetically modified stem cells have anti-tumor activity. If successful, we will have provided proof-of principle that long-lived stem cells have the potential be utilized as a means of producing anti-cancer T cells. In the long run, these results could provide important information for design of future clinical trials designed to produce life-long improved anti-cancer immune responses.

Statement of Benefit to California:

We propose to use human embryonic stem cells to develop a novel, yet potentially very effective method to treat invasive melanoma. Melanoma is a serious type of skin cancer which, if not removed early, spreads internally and is usually fatal. Overall melanoma is the 6th most common cancer in males and 7th in females and the incidence of this form of cancer is currently increasing at an epidemic rate. Although melanomas may occur in areas of skin that are not normally exposed to sunlight, sun exposure is believed to be a factor in about 70% of new cases. California's mild winters and high number of sunny days provide opportunities for a number of occupational and recreational outdoor activities, and people in California are exposed to more than average levels of solar radiation. Consequently, there is a higher risk of developing this disease. As a matter of fact, California is one of the five US states with the highest predicted incidence of new cases of melanoma. According to the California Cancer Registry, each year 4,700 new cases of invasive melanoma and over 800 deaths related to this disease are reported in California, with the incidence rate increasing by 15% over the last decade. While the white population is at the greatest risk of developing this disease, it was recently reported that the rates of invasive melanoma have risen substantially in Hispanic people living in California as well. If our proposal is successful, our work could pave the way to the development of a new and effective form of melanoma therapy, one which would clearly benefit all the people of California affected by this disease.
